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ABSTRACT

The results of this study reveal the sources of information apt to go into an information system for education. As part of a national study of the research and development (R&D) capacity of schools, colleges, and departments of education (SCDEs), indices of productivity for such units were derived on six variables: (1) the number of articles credited to faculty members in education over a three-year period in 26 journals selected as core publications; (2) the number of documents deposited in the RESOURCES IN EDUCATION portion of ERIC over a two-year period; (3) the number of books in education reviewed in the 26 journals already mentioned; (4) the number of papers read at the national conventions of six professional societies in education over a three-year period; (5) the number and dollar amounts of foundation grants for education research and development over a three-year period; and (6) the number and dollar amounts of government grants and contracts for educational R&D for a 21-month period. These data were tallied for as many of the 1,367 SCDEs as made contributions and/or received grants and contracts. It was determined that SCDEs contribute approximately 40 percent in most of the above areas and 56 percent in journal articles. However, only one out of five SCDEs contributed to the total educational R&D performance as measured by these six variables. (MM)

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WHO PRODUCES WHAT IN EDUCATIONAL RESEARCH AND DEVELOPMENT?

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As part of a national study of the R&D capacity of schools, colleges, and departments of education (SCDEs), we undertook to derive indices of productivity for such units on six variables: (1) the number of articles credited to faculty members in education over a three-year period in twenty-six journals selected as core or near-core publications; (2) the number of documents deposited in the Resources in Education (RIE) portion of ERIC over a two-year period; (3) the number of books in education reviewed in the 26 journals already mentioned; (4) the number of papers read at the national conventions of six professional societies in education over a three-year period; (5) the number and dollar amounts of foundation grants for educational R&D over a three-year period; and (6) the number and dollar amount of government grants and contracts for educational R&D for a 21-month period. These data were tallied for as many of the 1,367 SCDEs as made contributions and/or received grants and contracts.

It was our hope to use these several indices to derive an overall indicator of R&D productivity for each institution. When the data were finally accumulated, however, we were overcome by the magnitude of the task, especially since there appeared to be very wide variation among the several types of institutions which we had defined a priori. Finally, almost in desperation, we determined to attempt the formulation of a series of rules, each of which would successively eliminate some portion of the population from further consideration as an R&D producer. For this purpose we did not utilize book and convention data, however, since very often we had been unable to determine departmental affiliation for authors.

We began with a simple rule that would eliminate institutional non-producers, viz.:

1. Non-producers are SCDEs which accumulate no credits in any of the four criterion areas.

To our surprise, this rule eliminated from further consideration 773 of the SCDEs in the population--56.5 per cent of the total of 1,367. More than half of all SCDEs were not found to make any contribution whatever!

Next, we tried to eliminate those institutions in which it was clear that the contribution must have resulted from the idiosyncratic, unsupported efforts of a single faculty member--what we have come to call an idiographic contribution. How could one state a rule that would unequivocally guarantee that no more than one person could have been involved?

2. Low Producers--Idiographic are SCDEs with no grants or contracts for R&D projects and with no more than 1.0 credits in either journal publications or RIE.

This rule eliminated an additional 204 institutions--another 14.9 per cent of the total.

Next, we determined to state a rule which would separate out institutions in which R&D production was probably still the idiographic result of one man's efforts, but in which some institutional interest in or sanction for such activity was indicated. The rule:

3. Low Producers--Minimal are SCDEs with a single grant or contract for R&D activity in which there was no more than 1.0 credit in either journal publications or RIE.

The productivity in these institutions was still idiographic but the presence of a grant or contract indicated at least an institutional willingness to have one member of its faculty engage in R&D.

This rule culled out another 35 SCDEs or 2.56 per cent of the population.

Finally, in dealing with low producing institutions, we devised a rule that would permit more than one faculty member to be involved but which would still indicate a level of productivity which we felt that most observers would classify unambiguously as low. Institutions were admitted to this category whether or not they had a grant or contract (they never had more than one) so long as they accumulated a multiple entry--greater than 1.0--in either journals or RIE. To insure that the category did indeed represent a low producing type, however, it was stipulated that the multiple entry had to be in either journals or RIE but not both. The rule is:

> 4. Low Producers--Occasional are SCDEs with zero or one grant or contract for R&D activity in which the credits for either journals or RIE was zero and the credits in the other category did not exceed 3.0.

This rule excluded another 94 institutions--6.9 per cent of the total.

The categories in the system so far ranged from no evidence of R&D yield to an SCDE with one grant or contract for R&D activity and 3.0 credits in either journals or RIE. We hesitated to go above this level in describing low institutional productivity since the danger arises of penalizing smaller institutions simply because they have few faculty members in the SCDE. At this level of productivity, however, we felt that most observers would agree that these SCDEs were contributing little in the R&D arena in education. The rules were having a remarkable effect on the population of 1,367 SCDEs, however; 1,106 had already been classified by applying just these four rules.

We then turned our attention to the other end of the continuum. Who, we asked, are the high producers? Again, it seemed useful to distinguish among levels of high productivity. At the highest level, we felt, should be

placed those institutions that demonstrate persistent involvement in R&D project activity. As a matter of fact, the repeated selection of an institution to carry out projects under grants or contracts is at least a normative quality index applied by judges in the field of education, i.e., the officials, boards, panels, etc., of the granting institution. The level of document submission to RIE, we felt, should be high, and the institution should be held to at least a reasonable level of productivity in core journals since this too is a measure of quality as assessed by peers in the field--the journal editors and referees. Thus the following rule evolved:

> 5. High Producers--R&D Centers are SCDEs with five or more grants or contracts for R&D activity totaling funding of $750,000 or more; or with multiple grants or contracts for R&D activity plus fifty or more credits in the 26 "core" journals in education; or multiple grants or contracts with 35 or more credits in journals plus 25 or more credits in RIE.

In sharp contrast to the first low-producer rule which enabled 773 institutions to be immediately classified, this high-producer rule included only 24 institutions--1.8 per cent of the total--despite its modest requirements.

A second group was identified as outstanding producers. In examining the profile of productivity it was apparent that there was a group of institutions which was persistent in accumulating credits across the measures or was so outstanding on one criterion area that the institutional commitment to R&D seemed undeniable. The rule governing this category is:

> 6. High Producers--Other Outstanding Producers are SCDEs with multiple (more than one) grants or contracts for R&D productivity totaling funds of $250,000 or more; or 25 journal credits in the "core" journals; or 17.5 or more journal credits plus 12.5 or more credits in RIE.

This rule enabled the classification of another 36 institutions--2.6 per cent of the total.

A final group of high producers was defined which, while exhibiting multiple credits, usually also exhibited low productivity per faculty member. The rule is:

> 7. High Producers--R&D Actives are SCDEs with multiple grants or contracts for R&D activity totaling $100,000 or more; or 15 or more credits in "core" journals; or 10 or more credits in journals plus 7.5 or more RIE credits.

This rule classified an additional 39 institutions--2.8 per cent of the total.

Throughout the first seven categories, an effort was made to avoid the question of SCDE size in relation to R&D yield. The target of our study was the SCDE as an institution, not the faculty member as an individual. The low producers are so low that most observers would probably be content to ignore the size of the institution as a significant variable. At the other extreme, categories six and seven are so active that it seems reasonable to classify them as high producers even if they have large faculties. However, there were some institutions with unusual yield profiles in which small size obviously affected the institutions' abilities to break into the high producer category. So as not to lose sight of these SCDEs a category of unusual producers was formed. The rule was as follows:

> 8. Unusual Producers are SCDEs in categories with small median faculty size in which the level of R&D activity in the criterion areas was so high that the institutions would have been qualified under rules five, six, or seven above with the application of a size correction of circa 50 per cent of a true size correction; or an SCDE in a category with typically low R&D activity which was producing at a rate several times that of the category.

Unfortunately, only 26 institutions or 1.9 per cent were helped by this definition.

The remaining SCDEs were classified as middle range producers. The level of R&D activity necessary to qualify for this category is quite low despite that title. In an absolute sense many observers would probably be more comfortable in classifying these SCDEs as low producers, but in a relative sense these SCDEs are very competitive. The rule:

9. Middle Range Producers are SCDEs not covered by any of eight rules enumerated previously.

Some 136 SCDEs--10.0 per cent of the total--were assigned by this rule.

The general results of this mode of classification of the R&D productivity of SCDEs in shown in the handout Table 1. The categories defined by the nine rules which have been described form the basis for the columns of the table; the rows are defined in terms of an a priori classification system based upon the degree level (doctors, masters, baccalaureate) and the control (public, private) of the institutions. Several summary observations may be made from this table:

1. Only 24 institutions qualify as R&D Centers; all are doctoral level institutions.

2. Institutional commitment to educational R&D is very much a doctoral level phenomenon. While 58.9 per cent of doctoral institutions are classified in one or another of the high producer or unusual producer categories, but 6.0 per cent of the masters institutions and 0.7 per cent of the baccalaureate institution are so classified. Conversely, only 1.3 per cent of doctoral institutions are classified as non-producers, but 40.7 per cent of the masters institutions and 77.8 per cent of the baccalaureate institutions are so classified.

3. For all practical purposes, the number of institutions seriously committed to R&D is limited to the 125 institutions, whatever their degree level may be, that fall into the high producer or unusual producer categories.

4. The 26 institutions classified into the unusual producer category fall at all degree levels, indicating that there are prototypes at all such levels of R&D committed institutions which might serve as useful models for other institutions in their categories with R&D aspirations.

5. The total number of institutions engaged in educational R&D activity is small. The bottom end of the middle range producer category is already beyond the 80th percentile; the total of R&D Centers, Other Outstanding Producers, and R&D Actives accounts for less than 7.5 per cent of the total.

Whether or not the depiction of educational R&D activity within SCDEs that is portrayed in Table 1 is seen in a positive or negative light depends largely on the expectations one has for such activity in all types of SCDEs. If R&D activity is believed to be normative for SCDEs, the picture of Table 1 appears rather dismal. More than four in five SCDEs are nearly uninvolved in R&D. Given the low level of the criteria posed for institutions to be classified in at least the middle range producer category, one might have expected a larger proportion to have accumulated at least some credits. Two grants (even of a few hundred dollars each), two journal credits, a combination of one journal credit and one RIE credit, or a total of four RIE credits were sufficient to classify an institution as middle range. Surely one cannot be enthusiastic about such low level performance.

But the data also make it rather clear that most institutions do not acknowledge educational R&D among their missions, and do little if anything to support such activity institutionally. If we may accept the 125 institutions in the high or unusual producer categories as representing our best estimate of institutional involvement, we begin to see a picture among SCDEs not substantially different from that in other professional areas. It seems

likely that there are about 100-150 good medical, dental, legal, etc. schools in the country that might be expected to take an active interest in the R&D characteristic of those fields. It should not surprise us to discover that a similar situation holds for SCDEs. Indeed, it is probably a good thing that there are not more active competitors for the limited R&D dollars, staff, and programs than exist within these 125 institutions.

One should not leap to the conclusion that the 125 SCDEs that have selected R&D as a mission are performing at their optimum capability, however. Among the select institutions characterized in this study as R&D Centers, for example, it requires two faculty members working for a total of three years to produce one journal credit; about four faculty working for three years to produce one RIE entry; and up to 25 faculty (in the public institutions) to result in one foundation grant every three years or one government grant every 21 months. Institutions that profess to devote substantial resources to R&D activity probably cannot yet afford to rest on their laurels.

A Comparison with Some Other Sources

Each of the productivity studies was designed to provide data not only about the yield from SCDEs but also about a variety of other educational R&D producers within and outside the University setting. Comparative data will be presented that contrast SCDEs with three other major categories, viz.:

1. Other University units, including, for example, human development, psychology, political science, sociology, and health science departments; non-academic units such as the Presidents Office or Student Services Office; and all others specifically reported in the source documents.

2. Domestic, non-University sources, including, for example, elementary and secondary schools, state departments of edu-

cation, profit and non-profit R&D units, U.S. Government, business and industry, and the like.

3. All foreign sources, including foreign SCDEs.

In most instances, it was found that some entries could not unequivocally be associated with a particular department or unit if the author represented a university. This was especially true of book and convention credits, in which large numbers of "University Undesignated" credits were aggragated. It was for this reason that these tallies were not used in connection with institutional classification as reported above, since it was felt that serious errors could be made. For purposes of reporting class data, however, it was possible to apportion "University Undesignated" credits between SCDEs and non-SCDEs by assuming that they were distributed in the same ratio as were known credits, of which there was always an appreciable number usuable as a base for projection. The data to be presented have been adjusted using this procedure.

The basic findings are shown in handout Table 2. It will be seen that while SCDEs are not as productive as one might wish, they hold their own reasonably well in contrast with other broad categories of institutions. This conclusion seems especially warranted when one recalls that there are only about 125 SCDEs seriously committed to R&D as a mission area.

It will be seen that SCDEs rate best in the area of jounral publications--they accrue over 56 per cent of all article credits in the 26 core journals studied. Other university units, including all the social science departments which are frequently believed to be serious competitors for SCDEs in the educational R&D arena, contribute less than 8 per cent. Some discounting of this figure must of course be done on the grounds that fac-

ulty members from such other disciplines have their own journals in which to report and these were not studied; nevertheless the 26 journals included tended to be high prestige publications in which persons from other fields would undoubtedly be gratified to appear.

Domestic non-university sources constribute almost 31 per cent of journal articles, while foreign sources account for the remainder--just under 5 per cent.

The situation with respect to RIE is interesting in that despite the ease of entry, which most SCDE critics would take to be a basis for predicting high SCDE involvement, SCDEs in fact contribute less than 7 per cent of entries. By far the largest proportion comes from domestic non-University sources, over 68 per cent. Other university departments contribute more to RIE than do SCDEs but they also fall short of non-University sources. It is clear that RIE is the mode of communication among educational R&D personnel not associated with institutions of higher education.

Among the other indices, SCDEs typically provide some 40+ per cent. In all cases the foreign contribution is small. University non-SCDE sources provide heavily in the book area while non-University sources predominate in convention papers and foundation grants.

Whether this contribution from SCDEs is seen as laudable or not depends on one's perspective. Considering the very large number and variety of competitive agencies, their performance of a bit over 40 per cent in most areas and 56 per cent in journal articles must be considered exceptional, again recalling that only about 125 SCDEs are really involved. But considering that what is as stake is <u>educational R&D</u>, an arena in which almost no other agency defines a prime mission for itself, the less than half average seems to be

remarkably low. When one considers further that the SCDE contribution is made by fewer than one out of five institutions, it is clear that there is a great deal of room for improvement.

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TABLE 1

LEVEL OF R&D PRODUCTIVITY IN SCDEs BY INSTITUTIONAL TYPE

Category	Level of Productivity								
	High Producers			Unusual Producers	Middle Range Producers	Low Producers			Non-Producers
	R&D Centers	Other Outstanding Producers	R&D Actives			Occasional Producers	Minimal Producers	Idiographic Producers	
Pub Doct	18	24	24		36	4	2	2	2
Priv Doct	6	8	5	5	10	4		3	
Pub Mast		3	8	15	65	43	8	64	68
Priv Mast		1	1	3	12	20	14	50	143
Pub Bacc			1	2	7	10	2	21	43
Priv Bacc				1	3	11	9	56	389
"X"[1]					3	2		8	128
Total	24	36	39	26	136	94	35	204	773
Per Cent	1.76	2.63	2.85	1.90	9.95	6.88	2.56	14.92	56.55
Cum Per Ct	100.00	98.24	95.61	92.76	90.86	80.91	74.03	71.47	56.55

[1]These 141 institutions, while engaged in education personnel training, are excluded from their normal categories because of their special purpose nature, e.g., seminaries, business schools, art schools, etc.

TABLE 2

OVERVIEW OF SCDEs AMONG R&D PRODUCERS[1]

Source	Per Cent Credits				Per Cent Dollars	
	Journals	RIE	Books	Conventions	Foundations	SIE
SCDEs	56.56	6.64	40.39	41.86	44.79	42.85
Other University	7.71	18.13	42.14	13.17	11.60	57.15
Domestic Non-University	30.96	68.11	16.78	42.63	43.13	NA[2]
Foreign (Incl. SCDEs)	4.77	7.12	0.67	2.34	0.49	NA[2]
Total	100.00	100.00	99.98	100.00	100.01	NA[2]

[1]Figures entered for SCDEs are adjusted for "University Undesignated" entries,

[2]SIE data were computed for college/university sources only.